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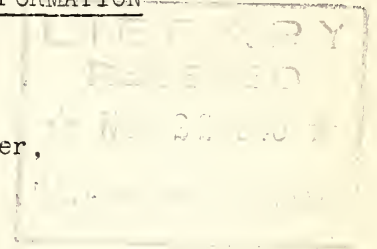
U. S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
CENTRAL STATES FOREST EXPERIMENT STATION
COLUMBUS, OHIO

Technical Note 21

September 15, 1940

EFFECT OF INTENSITY OF PRUNING ON SPROUT FORMATION
IN YOUNG PLANTED PITCH PINE

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A disadvantage associated with pruning of pitch pine trees (Pinus rigida Mill.) is the formation of sprouts on the pruned portion of the stem. Such sprouts are potential branches, and their growth defeats the purpose of pruning. The intensity of pruning has been thought to bear directly upon the amount of sprouting, and an investigation into the character of this relation was instituted in conjunction with a study of pruning as it affects height and diameter growth of pitch pine.

This joint study was initiated in 1939 on a pitch pine plantation at the Southern Illinois Branch of the Central States Forest Experiment Station. The plantation consisted of three strips totaling 1.5 acres and had been planted in 1935 to 1-1 stock. At the time of pruning the trees averaged 6.2 feet in height, 1.31 inches in diameter at breast height.

In early spring four degrees of pruning were assigned at random, each to about 50 trees on each strip. The pruning classes, as set up for the pruning experiment were as follows: (1) No pruning, i.e. left as check; (2) light pruning, only lower branches up to about 1.5 feet removed; (3) moderate pruning, to an average height of 2.75 feet, or slightly less than half the crown removed; (4) heavy pruning, two-thirds to three-quarters of the crown to an average height of 3.8 feet removed.

At the end of the growing season it was observed that, while sprouting was dense on heavily pruned trees, lightly pruned trees had relatively few sprouts per unit length of pruned stem. In order to examine the relation of sprout density to severity of pruning, sprouts on all lightly, moderately, and heavily pruned trees were counted, removed with pruning shears, and length measured in twentieths-feet. For each tree,

number and total length of sprouts, along with the height to which the tree had been pruned, were recorded. These figures were summarized for each strip or replicate, and for each of the three pruning classes. Total number and total length of sprouts were reduced to a per-foot-of-pruned-stem basis by dividing in each case by the total length of pruned stem, thus providing a uniform basis for comparison. Mean length of individual sprouts was calculated by the ratio of total number of sprouts over total length. A summary of these data is presented in table 1.

Table 1. Number and total length of sprouts per-foot-of-pruned-stem, and mean sprout length for three degrees of pruning.

Degree of pruning	Sprouts per foot pruned stem	Total sprout length per foot pruned stem	Mean individual sprout-length
	<u>Number</u>	<u>Feet</u>	<u>Feet</u>
Light	0.8	0.10	0.13
Moderate	1.6	0.29	0.18
Heavy	4.0	1.36	0.34

The data were subjected to analyses of variance and in each of the three tests of sprouting density a high significance appeared between pruning intensities. In table 2 are presented the minimum mean differences attaining significance and high significance.

Table 2. Minimum mean differences attaining levels of significance for number, total length and mean length of sprouts.

Significance		Sprouts per foot pruned stem	Total sprout length per foot pruned stem	Mean individual sprout-length
Degree	Level			
	<u>Percent</u>	<u>Number</u>	<u>Feet</u>	<u>Feet</u>
Significant	5	0.6	0.14	0.07
Highly "	1	1.0	0.23	0.12

Examination of means for number and total length of sprouts per foot of pruned stem revealed that the values for heavily pruned trees were highly significantly greater than those for either of the other two pruning levels. Differences between moderately and lightly pruned trees were significant in both cases. Average individual sprout length was highly significantly greater in the case of heavily pruned trees than for moderately and lightly pruned trees, but between the latter pruning levels there was no real difference.

These variations in amount of sprouting are of far greater magnitude than the corresponding differences in pruning intensity which induced them. With light pruning, i.e. removal of about one-quarter of the crown, relatively few short sprouts developed. Moderate pruning, removal of roughly one-half the crown, doubled the number of sprouts (per-foot-of-pruned-stem, not total) and tripled their collective length. By removing two-thirds to three-fourths of the crown, the number of sprouts became five times as great, their individual length two and one-half times and their aggregate length fourteen times as great as those induced by light pruning.

The development of stem sprouts consequent to pruning is an undesirable condition since, while pruning may improve wood quality, the presence and continued growth of sprouts constitute as great an eventual detriment as does the persistence of regular branches. The physiological implications, suggesting stimulation of dormant buds by sudden exposure to light, or upsetting the hormonal relations, are of practical, as well as purely scientific interest, and are being investigated by this Station.

SUMMARY

Three intensities of pruning, removing approximately one-quarter, one-half and three-quarters of the crown, when applied to six-year-old planted pitch pine in southern Illinois, induced sprout development on the pruned portion of the stem. The magnitude of this effect was directly contingent upon the relative severity of pruning. On the basis of mean length and number of sprouts per tree, per-foot-of-pruned-stem (all calculations thus being placed on a comparable level) differences between pruning treatments were highly significant, sprout formation on heavily pruned trees being up to fourteen times as dense as on lightly pruned trees.

